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AUTHOR Crites, John O.
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ABSTRACT

The problems involved in the measurement of vocational maturity are complicated by the hypothesized developmental nature of the behaviors to be quantified. One major problem mentioned is that of formulating a measurement model which incorporates the merits of established approaches to test construction yet circumvents their shortcomings. A brief review of approaches to such test construction is presented with some of the criticisms which have been made of them. A number of substantive and psychometric problems in the measurement of vocational maturity are identified. It is emphasized that their solutions are provisional and tentative, subject to further revision as the relevant data are gathered and analyzed. Problems which are not discussed include such imponderables as how to partition developmental score variance from stable and error variance, and how to control for the effects of environmental change and repeated measurements in longitudinal designs. (Author/BW)

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Problems in the Measurement of Vocational Maturity

John O. Crites

University of Maryland

The problems involved in the measurement of vocational maturity are not dissimilar to those encountered in the assessment of any variable, except that they are complicated by the hypothesized developmental nature of the behaviors to be quantified. Not only are there the general problems of reliability and validity in devising measures of vocational maturity, but there are several special problems which are occasioned by any attempt to operationally define variables presumed to change systematically over time. Foremost among these is the problem of formulating a measurement model which incorporates the merits of established approaches to test construction yet circumvents their shortcomings. A brief review of what these approaches are, and some of the criticisms which have been made of them, will serve to provide a point-of-departure for proposing a model appropriate for the measurement of vocational maturity, as well as other developmental concepts.

Approaches to Test Construction

As with the construction of achievement/aptitude tests, interest inventories, and personality instruments, a choice has usually been made between one or the other of the two approaches to measurement which have been most commonly used in the past: the rational and the empirical. The former is exemplified by the Bell Adjustment Inventory and the Kuder Vocational, and the latter by the Minnesota Multiphasic Personality Inventory and the Strong Vocational Interest Blank. In the rational approach, as Travers (1951) has observed, the variables of interest are first

CG 007 255

identified and defined conceptually; next, items are deduced and written from explicit hypotheses concerning their appropriateness and relevance; and, finally, the hypotheses are tested empirically in the validation process. Similarly, Flanagan (1951) has delineated three steps in the formulation of comprehensive rationales for items: (1) Description of the Behavior; (2) Analysis of the Behavior; and, (3) Formulation of Item Specifications. In contrast to this explicit, self-conscious construction of tests, the empirical approach is more inductive and pragmatic. Travers (1951, p. 130) has characterized it as a "try-all-and-see-what-works" technique, but it is somewhat more deliberate than this. Typically, a pool of items is accumulated, usually with some phenotypic if not genotypic relevance, and scales are constituted from those items which differentiate the criterion groups. Validation then proceeds much as it does in the rational approach. The major difference between the two test construction methodologies is the way in which items are conceived and scored, but it is exactly this difference which is the source of their respective strengths and weaknesses.

The rational approach to test construction has been more useful in the development of intellective than nonintellective measures, but even with the former it has too often produced tests of ability (achievement, aptitude, intelligence, proficiency, skill, etc.) which have only modest empirical validities and negligible theoretical meaningfulness. Likewise with many interest and personality inventories: few of their a priori scales correlate significantly with other independently defined variables. Thus, instruments such as the Edwards Personal Preference Schedule, even though based upon Murray's (1938) theory of needs, has belied its initial promise with its subsequent lack of validity for much of anything,

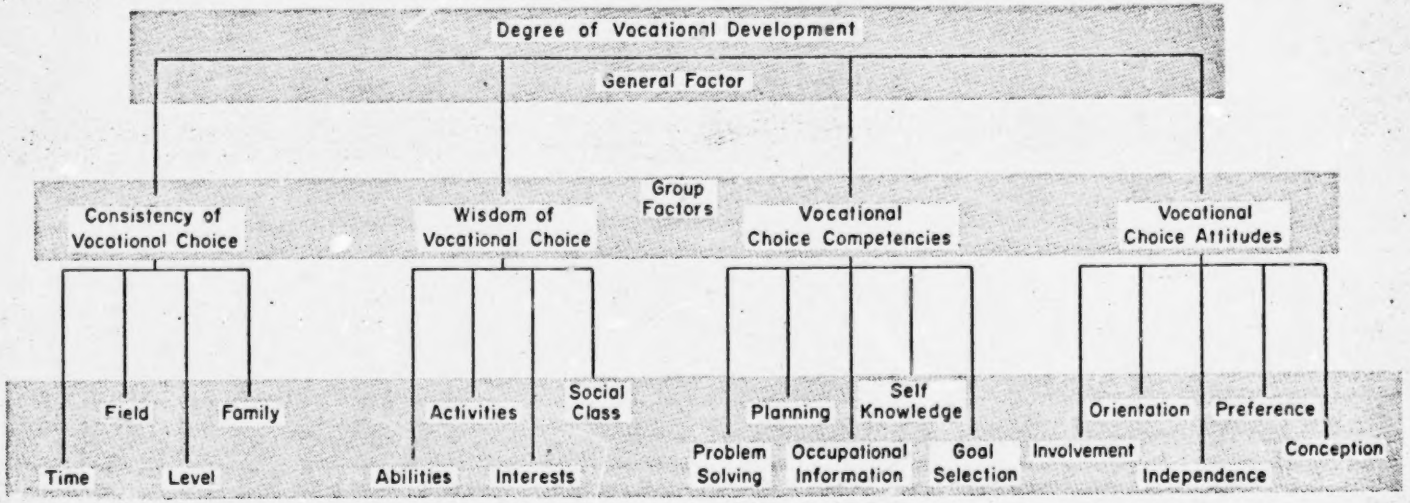
including the effective control of social desirability response sets (Buros, 1965; Super & Crites, 1962). Conversely, the empirical approach has yielded measures which have "built in" validity but usually questionable theoretical relevance. The "dustbowl empiricism" which has been the raison d'etre of the Strong Vocational Interest Blank for the past 40 years has retarded, if not precluded, the construction of an useful theory of vocational interests (Crites, 1969). Similarly, the MMPI practically defies the formulation of a theory of personality linked to its content with items like "I think Lincoln was greater than Washington." And, the so-called "folk concepts" underlying the California Psychological Inventory, such as "Poise, Ascendance, and self-Assurance", are hardly more abstract or subsumptive. Which approach, then, should be taken in the measurement of vocational maturity: the rational which sacrifices validity for theory, or the empirical which eschews theory for validity?

Were this dilemma one of mutually exclusive options, it would be difficult to choose between the two approaches, but it would appear that there is a viable alternative, since neither methodology necessarily precludes the other. Although they have been treated as if they are categorically different, they can be considered as varying in degree, not kind. What test items are keyed rationally uninfluenced by experience, albeit often informal and subjective, and how many test items are written completely devoid of rationale, however implicit and inarticulate? It would seem that the solution to which approach to use lies less in deciding between them than in combining their best features. Consider a test construction procedure consisting of the following steps: First, the variables of interest are identified, either as found in theoretical propositions or through survey research (Edwards, 1954), and are given

conceptual or "literary" definitions (Underwood, 1957). This step encompasses the aforementioned sequence of formulating comprehensive test rationales as outlined by Flanagan (1951). Second, items are written to conform with the rationales as well as whatever relevant behavioral data are available. The latter can be accumulated from "free-response" forms of preliminary tests with item stems phrased as questions (Cook, 1951; 1958). Not only does this innovation avoid the artificiality of "armchair speculation" but it provides a large universe of content for item foils. Third, and last, the item pool is "tried out" against the criterion groups of interest. Those items which differentiate significantly are both theoretically meaningful, because they have been deduced rationally, and psychometrically valid, because they have been related empirically to the criteria.

Measurement of Vocational Maturity

The application of the combined rational-empirical ("rapirical") approach to the measurement of vocational maturity, following the steps just ennumerated, requires first a specification of the variable(s) to be quantified. These were initially conceptualized and defined by Super (1955), who identified five major dimensions of vocational maturity during adolescence: (1) Orientation to Vocational Choice; (2) Information and Planning; (3) Consistency of Vocational Preferences; (4) Crystallization of Traits; and, (5) Wisdom of Vocational Preferences. Crites (1965) subsequently elaborated upon the Orientation, Information, and Crystallization dimensions and proposed that they be further analyzed into what might be called Vocational Choice Competencies and Vocational Choice Attitudes. Along with the Consistency and Wisdom variables, these revised dimensions were incorporated into the construct of vocational maturity shown in Figure 1.


Degree of Vocational Development
General Factor
Group Factors
Consistency of Vocational Choice
Wisdom of Vocational Choice
Vocational Choice Competencies
Vocational Choice Attitudes
Time
Field
Level
Family
Abilities
Activities
Interests
Social Class
Problem Solving
Planning
Occupational Information
Self Knowledge
Goal Selection
Involvement
Orientation
Independence
Preference
Conception

This schema was adopted from Vernon's (1950) hierarchical model of intelligence, in which the three levels represent increasing degrees of generality. At the most specific, operational level of the construct are the vocational behaviors which presumably mature during adolescence. At the intermediate level, they in turn comprise group factors on the basis of their hypothesized within- and between-cluster communalities. And, at the highest level of abstraction, the general factor represents the common variance among the groups and defines overall "degree of vocational development". This construct, then, provides a substantive model for the measurement of vocational maturity: the hypothesized dimensions along which vocational behaviors develop and their expected interrelationships.

There remains, however, the problem of an appropriate and adequate psychometric paradigm for vocational maturity. By analogy, the obvious choice would appear to be an age-scale like the Stanford-Binet. In an early analysis of vocational maturity, Super (1955, p. 153) observed that it "may be thought of as vocational age, conceptually similar to mental age in early adolescence, but practically different in late adolescence and early adulthood because more distinctions can be made in the developmental curve at these stages." The advantage of the age-scale model is that it "builds in" the time dimension, which is a sine qua non in the measurement of any developmental variable. Only those items are included which differentiate among successive age levels. In the Stanford-Binet, however, this procedure has resulted in "the lack of comparability of scores and score dispersions at different age levels, due to the assignment of different items or tests to these levels by frequency counts or percentage passing" (Crites, 1961, p. 257). The adoption of a point-scale format, as exemplified by the WAIS, in which there are homogeneous groupings of items, solves this problem but

not that of incorporating the time function as an index of development. In other words, the psychometric problem in measuring vocational maturity is one of constructing scales whose items (1) are related to time and (2) are comparable from one time unit to another. Given these specifications, it would then be possible to establish norms on the incidence of vocationally mature behaviors both within and between age and/or grade groupings.

A measure which fulfills these psychometric desiderata, as well as those of a rational-empirical approach to test construction, might be developed as follows: First, items are written which are theoretically relevant to the construct of vocational maturity and also linquistically representative of the verbal vocational behavior of adolescents. Second, those items are selected as indices of vocational maturity which differentiate among age and/or grade levels in adolescence in a systematic way. By the latter is meant that the function of the item means over time should be either linear or monotonic, the assumption being that developmental curves during this stage of life are progressive. Such functions may be either increasing or decreasing, thus allowing for both the acquisition and extinction of responses, and they may be either proportional or disproportional, depending upon the rate of vocational maturation, but they may not be curvilinear. In other words, the curves should not significantly reverse themselves. Finally, once items have been selected according to these criteria, research needs to be conducted on their other psychometric characteristics. It is <u>necessary</u> to demonstrate their developmental relationship to time, but not <u>sufficient</u> to establish them as useful measures of vocational maturity. Further studies must be made of internal consistency, response bias, stability, and validity. When these have been

completed, theoretical and applied research can be undertaken to test hypotheses and evaluate interventive programs, respectively.

Summary

These substantive and psychometric problems in the measurement of vocational maturity are only a few which can be identified, and the solutions to them are provisional and tentative, subject to future revision as the relevant data are gathered and analyzed. Problems which have not been discussed, but which are critical to the study of vocational maturity, include such imponderables as how to partition developmental score variance from stable and error variance, and how to control for the effects of environmental change and repreated measurements in longitudinal designs (Wohlwill, 1970).

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Figure Caption

1. The construct of vocational maturity.